

CLAIMS

1. A method for performing, as a function of a received signal, fine slot synchronization, definition of frame parity, and codegroup identification in a cellular communication system that uses a plurality of synchronization codes, the method comprising:
- correlating said received signal with at least some of said synchronization codes, obtaining corresponding energy values;
 - searching among said energy values, at least one maximum value, identifying, according to said at least one maximum value, a given number of said synchronization codes and the corresponding phases; and
 - performing said fine slot synchronization and identifying said codegroup on the basis of said given number of said synchronization codes and of the corresponding phases obtained by means of correlation;
 - dividing said synchronization codes into a plurality of possible codesets, each set of said plurality comprising a first synchronization code which identifies the corresponding set, and a codeset of remaining codes;
 - correlating said received signal with the first codes of said plurality of possible codesets, the search for said at least one maximum energy value identifying one of said first codes and the corresponding codeset in said plurality;
 - correlating said received signal with the remaining codes of said corresponding codeset of said plurality; and
 - performing said fine slot synchronization, identification of parity of the frame, and identifying said codegroup on the basis of said one of said first codes, of the remaining codes of said corresponding codeset of said plurality, and of the corresponding phases obtained by means of correlation.
2. The method according to Claim 1 further comprising:
- storing said received signal;
 - providing a single correlation block; and
 - using said single correlation block both for correlating said received signal with the first codes of said plurality of possible codesets and for

correlating said received signal with the remaining codes of said corresponding codeset of said plurality, at least one of said correlation operations being implemented on said received signal and stored.

3. The method according to Claim 2 further comprising searching said
5 at least one maximum energy value simultaneously to the correlation of said received signal with the first codes of said plurality of possible codesets.

4. The method according Claim 1 further comprising:
storing said received signal;
providing a single correlation module;
10 providing a single generating module for generating said synchronization codes; and
performing said correlation operations using, serially, said single correlation module and said single generating module for generating said synchronization codes, said correlation operations being implemented, at
15 least in part, on said received and stored signal.

5. The method according to Claim 1, wherein said correlation operations are performed by finite-impulse-response filters.

6. A device for performing, according to a received signal, fine slot synchronization and identification of frame parity, and identifying the
20 codegroup in a cellular communication system that uses a plurality of synchronization codes, said device comprising:
at least one correlator for correlating said received signal with at least some of said synchronization codes, to obtain corresponding energy values;
a unit for determination of energy values for searching, among said
25 energy values, at least one maximum value, identifying, according to said at least one maximum value, a given number of said synchronization codes and the corresponding phases; and
a processing module for performing said frame synchronization and identifying said codegroup on the basis of said given number of said

synchronization codes and of the corresponding phases obtained by means of correlation;

wherein said at least one correlator is configured for correlating said received signal:

5 with the first codes of a plurality of possible codesets of said synchronization codes, each set of said plurality comprising a first synchronization code which identifies the corresponding set, and a subset of remaining codes so that the search for said at least one maximum energy value by said unit for determination of energy values identifies one of said first
10 codes and the corresponding codeset in said plurality; and

 with the remaining codes of said corresponding codeset of said plurality; and

 wherein said processing module is configured for performing said fine slot synchronization and identification of said frame parity, and identifying said
15 codegroup on the basis of said one of said first codes, of the remaining codes of said corresponding codeset of said plurality, as well as of the corresponding phases obtained by means of correlation.

7. The device according to Claim 6, further comprising:

a storage unit for storing said received signal; and

20 a single correlation block configured both for correlating said received signal with the first codes of said plurality of possible codesets and for correlating said received signal with the remaining codes of said corresponding codeset of said plurality, at least one of said correlation operations being implemented on said received signal and stored in said
25 storage unit.

8. The device according to Claim 7, wherein said unit for determination of energy values is configured for searching said at least one maximum energy value simultaneously to the correlation, implemented in said at least one correlator, of said received signal with the first codes of said plurality of
30 possible codesets.

9. The device according to Claim 6, further comprising:

a storage unit for storing said received signal;
a single correlation module;
a single generating module for generating said synchronization codes;
and

5 a controller module configured for operating, in a serial way, said single correlation module and said single generating module for generating said synchronization codes, said correlation operations being implemented, at least in part, on said received signal and stored in said storage unit.

10 10. The device according to Claim 6, wherein said at least one correlator comprises finite-impulse-response filters.

11. The device according to Claim 6, further comprising a receiver for a telecommunication system based upon a standard including the group consisting of 3 GPP FDD, UMTS, CDMA2000, IS95, and WBCDMA.

15 12. A computer product, directly loadable into the memory of a computer and comprising software code portions for implementing, when the product is run on a computer, a method for performing, as a function of a received signal, fine slot synchronization, definition of frame parity, and codegroup identification in a cellular communication system that uses a plurality of synchronization codes, comprising:

20 correlating said received signal with at least some of said synchronization codes, obtaining corresponding energy values;
searching among said energy values, at least one maximum value, identifying, according to said at least one maximum value, a given number of said synchronization codes and the corresponding phases; and

25 performing said fine slot synchronization and identifying said codegroup on the basis of said given number of said synchronization codes and of the corresponding phases obtained by means of correlation;

dividing said synchronization codes into a plurality of possible codesets, each set of said plurality comprising a first synchronization code
30 which identifies the corresponding set, and a codeset of remaining codes;

correlating said received signal with the first codes of said plurality of possible codesets, the search for said at least one maximum energy value identifying one of said first codes and the corresponding codeset in said plurality;

- 5 correlating said received signal with the remaining codes of said corresponding codeset of said plurality; and
- performing said fine slot synchronization, identification of parity of the frame, and identifying said codegroup on the basis of said one of said first codes, of the remaining codes of said corresponding codeset of said plurality,
- 10 and of the corresponding phases obtained by means of correlation.

13. The method according to Claim 12 further comprising:

storing said received signal;

providing a single correlation block; and

- using said single correlation block both for correlating said received
- 15 signal with the first codes of said plurality of possible codesets and for correlating said received signal with the remaining codes of said corresponding codeset of said plurality, at least one of said correlation operations being implemented on said received signal and stored.

14. The method according to Claim 13 further comprising searching
- 20 said at least one maximum energy value simultaneously to the correlation of said received signal with the first codes of said plurality of possible codesets.

15. The method according Claim 12 further comprising:

storing said received signal;

providing a single correlation module;

- 25 providing a single generating module for generating said synchronization codes; and

- performing said correlation operations using, serially, said single correlation module and said single generating module for generating said synchronization codes, said correlation operations being implemented, at
- 30 least in part, on said received and stored signal.

16. The method according to Claim 12, wherein said correlation operations are performed by finite-impulse-response filters.